

Claims:

1. An immunogenic construct comprising amino acid sequences selected from a viral transmembrane envelope protein which is associated with the viral membrane via at least one transmembrane region and comprises at least one fusion domain and at least two α -helical structures, characterized in that the amino acid sequences are selected from
 - (i) a first region of the envelope protein, located between the transmembrane region and a first α -helical structure, and
 - (ii) a second region located between the fusion domain and a second α -helical structure,and/or
that the construct comprises the DNA encoding the respective amino acid sequences.
2. The immunogenic construct according to claim 1, characterized in that the selected amino acid sequences are a synthetic peptide, a recombinant protein, a sequence for the respective amino acid sequence encoded by an appropriate DNA and/or a combination thereof.
3. The immunogenic construct according to claim 1 or 2, characterized in that

the first α -helical structure is a C-terminal helix and the second α -helical structure is a N-terminal helix of the envelope protein.

4. The immunogenic construct according to any of claims 1 to 3, characterized in that
the envelope protein is a protein of a virus selected from the group of BIV, CEAV, EIAV1, FIV, OMVV, SIVmac, SIVcpz, VILV, HIV-1, HIV-2, RSV, ALV, JSRV, SRV, GALV, MLV, FeLV, BLV, HTLV-1, HTLV-2, KoRV, SARS virus and/or HPV-1.
5. The immunogenic construct according to any of claims 1 to 4, characterized in that
the envelope protein is GP2, gp20, gp21, gp30, gp36, gp37, gp40, gp41, gp45, gp160, p15E, E2, HA2 and/or F2.
6. The immunogenic construct according to any of claims 1 to 5, characterized in that
said at least two amino acid sequences are selected from the group of N-terminal and C-terminal sequences comprising at least one sequence of Nos. 1 to 104 and/or the DNA encoding same.
7. The immunogenic construct according to any of claims 1 to 6, characterized in that
the amino acid sequences and/or the DNA encoding same are linked to or associated with each other.
8. The immunogenic construct according to any of claims 1 to 7, characterized in that
the amino acid sequences and/or the DNA encoding same are associated with liposomes, particularly entrapped in and/or anchored on a liposomal membrane.

9. A pharmaceutical agent comprising at least one of the immunogenic constructs according to any of claims 1 to 8, optionally together with pharmaceutically tolerable adjuvants.
10. The pharmaceutical agent according to claim 9 for use as immunotherapeutic or immunoprophylactic agent.
11. The pharmaceutical agent according to claim 9 or 10, characterized in that
it comprises at least one additional immunogenic component of the same virus or of other pathogens, particularly selected from the group comprising bordetella, hemophilus, borrelia, pseudomonas, corynebacteria, mycobacteria, streptococcus, salmonella, pneumococcus, staphylococcus and/or clostridia.
12. The pharmaceutical agent according to any of claims 9 to 11, characterized in that
it comprises cytokines or DNA thereof, particularly interleukin-2, 4, 12 and/or GM-CSF.
13. The pharmaceutical agent according to any of claims 9 to 12, characterized in that
at least one amino acid sequence is linked to a carrier system.
14. The pharmaceutical agent according to any of claims 9 to 13, characterized in that
the adjuvants or the carrier system are constituted of one or more protein fragments linked via a peptide bond to the outer N- or C-terminal end of said amino acid sequence.
15. The pharmaceutical agent according to any of claims 9 to 14, characterized in that

the adjuvants or the carrier system are selected from the group comprising albumins, KLH and/or dextrans.

16. The pharmaceutical agent according to any of claims 9 to 15, characterized in that it additionally comprises at least one non-specific immune adjuvant.
17. An amino acid sequence selected from the group comprising a sequence of SEQ ID Nos. 1 to 104 and/or a DNA encoding same for use in medicine.
18. Neutralizing antibodies produced by immunization using the immunogenic construct according to any of claims 1 to 8.
19. A kit for the detection of antibodies, said kit comprising the immunogenic construct according to any of claims 1 to 8, for use in diagnosis, follow-up and/or therapy monitoring of viral diseases.
20. A kit for the detection of viral antigens, said kit comprising a neutralizing antibody according to claim 18, for use in diagnosis, follow-up and/or therapy monitoring of viral diseases.
21. A method for inducing an antibody response, characterized in that the immunogenic construct according to any of claims 1 to 8 and/or the pharmaceutical agent according to any of claims 9 to 16 are contacted with an organism.
22. The method according to claim 21, characterized in that said contacting is effected on an oral, anal, rectal, vaginal, intravenous, intradermal, subcutaneous and/or intramuscular route.

23. The method according to claim 21 or 22,
characterized in that
said induction of an antibody response is prophylactic or therapeutic.
24. The method according to claim 23,
characterized in that
the antibodies of claim 18 are used in the therapy of a viral disease,
particularly a retroviral disease, preferably HIV.
25. Use of the immunogenic construct according to any of claims 1 to 8, the
pharmaceutical agent according to any of claims 9 to 16, at least one
amino acid sequence according to claim 17 and/or the neutralizing anti-
body according to claim 18 in the diagnosis, prophylaxis, therapy and/or fol-
low-up of viral diseases, particularly retroviral diseases.
26. Use of the kit according to claim 19 or 20 in the diagnosis and/or follow-up
of viral diseases, particularly retroviral diseases.
27. The use according to claim 25 or 26,
characterized in that
the viral disease is selected from the group comprising BIV, CEAV, EIAV1,
FIV, OMVV, SIVmac, SIVcpz, VILV, HIV-1, HIV-2, RSV, ALV, JSRV, SRV,
GALV, MLV, FeLV, BLV, HTLV-1, HTLV-2, KoRV, SARS virus and/or
HPV-1.
28. Use of the immunogenic construct according to any of claims 1 to 8 in a
neutralization assay.
29. A method for the production of an antibody against a retroviral disease,
characterized in that
an organism is contacted with the immunogenic construct according to any
of claims 1 to 8, the pharmaceutical agent according to any of claims 9 to

- 16, at least one amino acid sequence according to claim 17 and/or the neutralizing antibody according to claim 18, thereby inducing a humoral immune response via formation of antibodies, and the antibodies are subsequently obtained from the organism.
30. A method for the passive immunization of an organism, characterized in that the antibodies obtained according to the method of claim 29 are contacted with an organism.
31. An immunoassay for the detection of BIV, CEAV, EIAV1, FIV, OMVV, SIVmac, SIVcpz, VILV, HIV-1, HIV-2, RSV, ALV, JSRV, SRV, GALV, MLV, FeLV, BLV, HTLV-1, HTLV-2, KoRV, SARS virus and/or HPV-1 antibodies in a biological sample, comprising
- a) coating a solid phase with the immunogenic construct according to any of claims 1 to 8,
 - b) incubating the solid phase with the biological sample,
 - c) incubating the solid phase with an anti-human antibody capable of detecting the classes IgA, IgM, IgG, which antibody is labelled with a detectable label, and
 - d) detecting the label in order to determine the presence of binding antibodies against the above-mentioned viruses in the sample.
32. An immunoassay for the detection of viral antigens in a biological sample, comprising
- a) coating a solid phase with the neutralizing antibody according to claim 18,

- b) incubating the solid phase with the biological sample,
- c) incubating the solid phase with a second antibody against the viral antigens to be found, said antibody being different from the first one and obtained from an animal or human following immunization with the immunogenic construct according to any of claims 1 to 8, and
- d) detecting the coupled second antibody so as to determine the amount of bound antigen.

Reference list of amino acid sequences

SEQ ID No 1 QARQLLSDIVQQQ,
SEQ ID No 2 ELDKWASLWNWFN,
SEQ ID No 3 GASVTLTVQARQLLSDIVQQQ,
SEQ ID No 4 ELDKWASLWNWFNITNWLWY,
SEQ ID No 5 LGAAGSTMGAASVTLTVQARLLLS,
SEQ ID No 6 NEQELLELDKWASLWNWFDITNWL,
SEQ ID No 7 FLGFLGAAGSTMGAASITLTVQARQLLS,
SEQ ID No 8 FLGFLGAAGSTMGAASMTLTVQARQLLS,
SEQ ID No 9 FLGFLGAAGSTMGAASLTLTVQARQLLS,
SEQ ID No 10 LLGFLGAAGSTMGAASITLTVQARQLLS,
SEQ ID No 11 FLGFLGAAGSTMGAASITLTVQVRQLLS,
SEQ ID No 12 FLGVLSAAGSTMGAAATALTVQHTLMK,
SEQ ID No 13 NEQDLLALDKWASLWNWFDITNWLWYIK,
SEQ ID No 14 NEQDLLALDKWANLWNWFDISNWLWYIK,
SEQ ID No 15 NEQDLLALDKWANLWNWFDITNWLWYIR,
SEQ ID No 16 NEQELLELDKWASLWNWFDITNWLWYIK,
SEQ ID No 17 NEKDLLALDSWQNLWNWFDITNWLWYIK,
SEQ ID No 18 NEQELLELDKWASLWNWFSITQWLWYIK,
SEQ ID No 19 NEQELLALDKWASLWNWFDISNWLWYIK,
SEQ ID No 20 NEQDLLALDKWDNLWSWFSITNWLWYIK,
SEQ ID No 21 NEQDLLALDKWASLWNWFDITKWLWYIK,
SEQ ID No 22 NEQDLLALDKWASLWNWFSITNWLWYIK,
SEQ ID No 23 NEKKLLELDEWASIWNWLDITKWLWYIK,
SEQ ID No 24 AVGLAIFLLVLAIMAITSSLVAATTLVNQHTTAKV,
SEQ ID No 25 SLSDTQDTFGLETSIFDHLVQLFDWTSWKDWIK,
SEQ ID No 26 GVGLVIMLVIMAIVAAAGASLGVANAIQQSYTKAAVQTLAN,
SEQ ID No 27 AMTQLAEEQARRIPEVWESLKDVFDWWSGWFSWLKYI,
SEQ ID No 28 FGISAIVAAIVAATAIARSATMSYVALTEVNKIMEVQNH,
SEQ ID No 29 LAQSMITFNTPDZIAQFGKDLWSHIGNWIPGLGASIIKY,

SEQ ID No 30

SSSYSGTKMACPSNRGILRNWYNPVAGLRQSLEQYQVVKQPDYLLVPE,

SEQ ID No 31 MDIEQNNVQKGIGIQQQLQKWEDWVRWIGNIPQYLK,

SEQ ID No 32

GIGLVIVLAIMAIIAAAGAGLGVANAVQQSSYTRTAVQSLANATAAQQN,

SEQ ID No 33 QVQIAQRDAQRIPDVWKALQEAFDWSGWFSWLKYIPW,

SEQ ID No 34 LGFLGFLATAGSAMGAASLVTAQSRTLLAVIVQQQQQLLDVW,

SEQ ID No 35 EEAQIQQEKNMYELWKLNWWDVFGNWFDTLSWDLTSWIKY,

SEQ ID No 36 LGALGFLGAAGSTMGAAAVTLTVQARQLLSGIVQQQNNLL,

SEQ ID No 37 EEAQSQQEKNERDLLELDQWASLWNWFDITKWLWYIK,

SEQ ID No 38

GIGLVIVLAIMAIIAAAGAGLGVANAVQQSYTRTAVGSLANATAAQQE,

SEQ ID No 39 EAALQVHIAQRDARRIPDAWKAIQEAFNNWSSWFSWLKY,

SEQ ID No 40 LGFLGFLATAGSAMGARSLTLSAQSRRTLLAGIVQQQQQLL

SEQ ID No 41 EEAQIQEKNMYELQKLNSWDILGNWFDLISWWKYIQ,

SEQ ID No 42 WGPTARIFASILAPGVAAAQALREIERLACWSVKQANLTTSLL,

SEQ ID No 43 KFQLMKKHVNKIGVDSDDPIGSWLRGIFGGIGEWAVH,

SEQ ID No 44 SVSHLSSDCNDEVQLWSVTARIFASFFAOGVAAQALKEIERLA,

SEQ ID No 45 ALQAMKEHTEKIRVEDDOIGDWFTRTFGGLGGWLAK,

SEQ ID No 46

GLSLIILGIVSLITLIATAVTACCSLAQSIQAAHTVDLSSQNVTKVMGT,

SEQ ID No 47 IENSPKATLNIADTVDNFLQNLFSNFP SLHSLNCTL,

SEQ ID No 48

AVTLIPLLVLGLGVSTAVATGTAGLGVAVQSYTKLSHQLINDVQALSSTI,

SEQ ID No 49 KIKNLQEDLEKRRKALADNLFLTGLNGLLPYLLP,

SEQ ID No 50

AIQFIPLVIGLGITTAVSTGTAGLGVSLTWYTKLSHQLISDBQAISSTI,

SEQ ID No 51 KIKNLQDDLEKRRKQLIDNPFWTGFHLLPYVMPL,

SEQ ID No 52 DPVSLTVALLLGGTLMGSLAAGIGTGTAALIETNQFKQLQ,

SEQ ID No 53 SMAKLRRERFKQRQKLFESQQGQFEGWYNKSPWETT,

SEQ ID No 54 AVSLTLAVLLGLGITAGIGGSTALIKGPIDLQQGLTSLQIAIDAD,

SEQ ID No 55 SMKKLKEKLDKRQLERQDSQNWYEGWFNNWPWFTT,

SEQ ID No 56

EPVSLTLALLLGGLTMGGIAGVGTGTTALVATQQFQQLQAAMHD,

SEQ ID No 57 SMAKLRRERLSQRQKLFESQQGWFEGLFNKSPWFTT,

SEQ ID No 58

EPISLTVALMLGLTVGGIAAGCGTGTKALLEAQFLQLQMQMHTD,

SEQ ID No 59 NMAKLRRERLKQRQQLFDSQQGWFEFNRSPWFTT,

SEQ ID No 60 SPVAALTGLGLSVGLTGINVAVSALSHQRLTSLIHVLEQDQQ,

SEQ ID No 61 PLSQRVSTDWQWPWNWDL GLTAWVRET,

SEQ ID No 62 AVPVAWLVSALAMGAGVAGGITGSMASLASGKSLLHEV,

SEQ ID No 63 PILQERPPLENRVLTGWGLNWDLGLSQWAREALQ,

SEQ ID No 64 AVPIAVWSVSALAAGTGIAGGVGTGSLSLASSKSLLLEVD,

SEQ ID No 65 SVLQERPPELEKRVITGWGLNWDLGLSQWAREALQ,

SEQ ID No 66

FPNINENTAYSGENENDCDAELRIWSVQEDDLAAGLSWIPFFGPGI,

SEQ ID No 67 KNISEQIDQIKKDEQKIGRGWGLGGKWWTSDWG,

SEQ ID No 68

LITGGRRTTRREAIVNAQPKCNPNLHYWTQDEGAAIGLAWIPYFGPAA,

SEQ ID No 69 KNITDKIDQIIHDFVDKTLDPDQGDNDNWWTGWRQWI,

SEQ ID No 70

LITGRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDF,

SEQ ID No 71 DRLNEVAKNLNESLIDLQELKYEQYKWPWYVW,

SEQ ID No 72

GLFGAIAAGFIENGWEGMIDGWYGFRHQNSEGTGQAADLKSTQAA,

SEQ ID No 73 HDVYRDEALNNRFQIKGVELKSGYKDWILISFA,

SEQ ID No 74

FAGVVLAGAALGVATAAQITAGIALHQSMMLSSQAIDNLRASLETT,

SEQ ID No 75 IAKLEDAKELLESSKQILRSMKGLSSTSIVY,

SEQ ID No 76

FAGIAIGIAALGVATAAQVTAASLVQAQTNARAAAMKNSIQTNR,

SEQ ID No 77 TELSKVNASLQNAVQKIKESNHQLQSVSVSSK,

SEQ ID No 78 FFGAVIGTIALGVATAAQITAGIALAEAREARKDIALIKDSIVKTH,

SEQ ID No 79 TNFLEESKTELMKARAIISVGGWHNTESTQ.

SEQ ID No 80 LGAAGSTMGAASVTLTVQARLLLS) and

SEQ ID No 81 NEQELLELDKWASLWNWFDIT NWL

SEQ ID No 82

LITQARQLLSDIVQQQRIVTEDLQALEKSVSNLEESLTSLSSEVVLQNRRGLDLLF
LKKEGLCVALKEECCFYVDHSGAIRDMSKLRERLERRRREELDKWASLWNW
FN

SEQ ID No 83

LITGASVTLTVQARQLLSDIVQQQRIVTEDLQALEKSVSNLEESLTSLSSEVVLQN
RRGLDLLFLKKEGLCVALKEECCFYVDHSGAIRDMSKLRERLERRRREELDK
WASLWNWFNITNWLWY

SEQ ID No 84

LGAAGSTMGAASVTLTVQARLLSSSPSSNEQELLELDKWASLWNWFDITNWL
SEQ ID No 85

MGCTSMTLTVQARQLLSDIVQQQNNLLRAIEAQQHLLQLTVWGIKQLQARILAV
ERYLKDQQLLGIWGCSGKLICTTAVPWNASWSNKSLEQIWNNMTWMEWDREI
NNYTSLIHSLIEESQNQQEKNEQELLELDKWASLWNWFNITNWLWYIK

SEQ ID No 86 AASVTLTVQARLLLS

SEQ ID No 87 AAAATLTVQARLLLS

SEQ ID No 88 AASVAATVQARLLLS

SEQ ID No 89 AASVTLAAQARLLLS

SEQ ID No 90 AASVTLTVAARLLLS

SEQ ID No 91 AASVTLTVQAAALLS

SEQ ID No 92 LGAAGSTMGAASVTLTVQARLLLS

SEQ ID No 93 NEQELLELDKWASLWNWFDITNWL

SEQ ID No 94

FLGFLGAAGSTMGARSMTLTVQARQLLSGIVQQQNNLLRAIEAQQ

SEQ ID No 95

FLGAAGSTMGAASMTLTVQARQLLSGIVQQQNNLLRAIEAQQHLL

SEQ ID No 96

FLGAAGSTMGAASVTLTVQARLLLSGIVQQQNNLLRAIEAQQHML

SEQ ID No 97 SQNQQEKNEQELLELDKWAGLWSWFSITNWLWY

SEQ ID No 98 SQNQQEKNEQELLELDKWASLWNWFNITNWLWY

SEQ ID No 99 SQTQQEKNEQELLELDKWASLWNWFDITNWLWY

Seq ID No 100

LETAQFRQLQMAMHTDIQALEESISALEKSLTSLSEVVLQNRRGLDILFLQEGGL
CAALKEECCFYADHTGLVRDNMAKLRERLQQRQQLFDSQQGWFEGWFNKSP
W

Seq ID No 101 TAALITGPQQLEKGLSNLHRIVTEDLQALEKSVSNL

Seq ID No 102 DHSGAIRDSMSKLRERLERRRREREADQGWFEGWFNR

Seq ID No 103 TALIKGPIDLQQGLTSLQIAMDTDLRALQDSISKLED

Seq ID No 104 SMRRLKERLQDKRQLEHQKNLSWYEGWFNRSPWLTT